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ABSTRACT

This study examined whether or not first- and third-grade pupils could verbally communicate a task as effectively as the experimenter and whether or not pupils and teacher aides could listen as well as certified teachers. One hundred and twenty first- and third-grade pupils, teachers, and teacher aides from a predominantly black, inner-city school were asked to listen to descriptions of pictures tape-recorded by other first- and third-grade pupils and by one of the experimenters. On the basis of the descriptions, each listener was to select six out of 24 pictures. Analysis showed that teachers, teacher aides, and third-grade pupils did not differ significantly in correct picture selection, but that the latter three groups scored significantly higher than first-grade listeners. Also, all listeners scored significantly higher when listening to the experimenter rather than to pupils and when listening to third-grade speakers rather than first-grade speakers. The authors discuss implications for teacher aide roles, cross-age teaching, and nonverbal research. (LP)

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EFFECTIVENESS OF VERBAL COMMUNICATION AMONG ELEMENTARY SCHOOL PUPILS, TEACHERS AND TEACHER AIDES

Paper presented at the 1971 AERA convention

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EFFECTIVENESS OF VERBAL COMMUNICATION AMONG ELEMENTARY SCHOOL PUPILS, TEACHERS AND TEACHER AIDES[1]

Nongraded programs and the use of teacher aides are two innovations that have become increasingly widespread in elementary education over the past decade.[2] The major goal of nongraded programs has been to provide greater individualization and flexibility of instruction. Although most nongraded schools were initially organized around the principle of the single-teacher, self-contained classroom, the concept of team teaching has come to play an important role, and increasing emphasis has been given to the use of teacher aides in such programs.[3] The primary role of the teacher aide, in both graded and nongraded programs, has been to take charge of a large number of clerical and supervisory tasks (e.g. record keeping, lunch duty) in order to provide the teacher with more time for planning and coordinating the diverse activities involved in a flexible, individualized program of instruction.

One feature of these innovations that is beginning to receive attention is the role that nongraded practices and teacher aides may play in expanding the channels of verbal communication beyond those normally available in the conventional single-teacher, single-grade classroom. A recent study regarding the rapidly increasing use

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[1]We wish to express our thanks to Mr. Walter Purdy, Principal of Helmer's School, Jackson, Michigan for his extensive assistance in carrying out this study.

[2]In a 1961 NEA survey of 804 elementary schools, it was reported that 6 percent of the schools had some nongraded sequences in 1956, whereas 12 percent had some nongraded sequences in 1961. A May 1964 survey by the Educational Research Service of the NEA revealed that, out of the 353 school systems which responded to the survey (cards having been sent to 441 school systems with enrollments of 12,000 or more), 32.3 percent reported one or more elementary schools with a nongraded sequence. (NEA, May 1965, in Miller, 1967, pp. 157-191).

Concerning the use of teacher aides, a spring 1969 sample survey conducted by the NEA reported that one classroom teacher in four had the support of a teacher aide, in the school year 1968-69, an increase of one third over the school year 1966-67 when 19 percent of the nation's teachers reported such assistance. (NEA, March 1970).

[3]Discussions of the role of teacher aides in the nongraded program may be found in Goodlad (1959), Miller (1967), and Dyer (1969).

of auxiliary school personnel stated that use of teacher aides from the local community might be expected to bring about better communication between teachers and pupils of different ethnic or socioeconomic backgrounds.[4] In particular, there has been growing emphasis on the recruitment of persons from black "inner city" communities to work as teacher aides in local schools. Although the major duties of most teacher aides are non-instructional in nature, the use of aides in assisting with instruction of small groups or individual pupils is increasing.[5] Moreover, a small number of nongraded elementary schools have gone one step further, and are experimenting with a mixed-age, mixed-ability "family group" approach designed to encourage children to teach other children.[6] A basic assumption underlying the use of teacher aides in an instructional capacity and the use of pupils as "teachers" of other pupils is that verbal communication relevant to the performance of a school task can take place as effectively, or nearly as effectively, between pupils and teacher aides and between pupils of different ages, as between pupils and the certified teacher. This study was designed to investigate the validity of such an assumption by means of an experimental speaker-listener communication task involving first and third-grade pupils, teacher aides and teachers.

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[4]Bowman, 1966.
An Indianapolis Headstart project employing teacher aides from the local community found that the aides helped to bridge the communication gap between the middle class professional teacher and the children and parents of low socio-economic status (Friedman, 1969).

[5]A spring 1969 survey by the NEA revealed that of the nation's teachers having use of a teacher aide, 72.2 percent reported teacher aide clerical assistance, and 26-27 percent reported teacher aide assistance with various instructional activities. The NEA research report stated that the percentage of teachers receiving clerical assistance has remained unchanged since 1967, while the percentage receiving assistance with instructional activities has increased (amount of increase not stated). (NEA, 1970).

[6]The authors have found very little data concerning the extent to which "family grouping" has been adopted. The Franklin School in Detroit, Michigan instituted a family group approach to nongradedness in 1961. In fall 1969, Helmer's School in Jackson, Michigan set up a family group program modeled largely after the program at the World of Inquiry School, Rochester, New York. Featherstone (1967) reported that a very small number of schools in Great Britain have adopted family grouping.

METHOD

Task

Several types of speaker-listener tasks have been developed in order to assess the referential communication skills of school-age children. Cohen and Klein (1968) used a word communication task in which a speaker gave one-word clues in attempting to guide the listener to choose the correct of a pair of words. Tasks involving graphic or pictorial stimuli and requiring more complex verbal clues, have been developed by Glucksberg, Krauss and Weisberg (1966) and by Kaplan and Yonas (1966). The Glucksberg et al task required listeners to order novel graphic designs on the basis of verbal descriptions from speakers. The Kaplan and Yonas task involved sets of pictures which varied on one and only one dimension; having listened to a speaker's description of one picture in the set, the listener attempted to select the picture described.

The experimental materials in the present study were developed along the lines of the Kaplan and Yonas task. Since this experiment was intended to measure communication of the sort that would occur in a classroom setting, pictures similar to those generally found in children's reading primers and workbooks were considered preferable to novel graphic designs in order to maximize the task validity of the experiment (Shulman, 1970).

The task in this study included six items, each consisting of four pictures selected from the illustrations of a story in a first-grade primer.[7] Each set constituted a "story-telling" sequence portraying a family activity, thus maintaining a high degree of similarity across items. The pictures were removed from the primer so as to eliminate all printed text and mounted on 7" x 7" squares. The resultant materials were therefore uniform in size, shape and general appearance. One picture in each set was designated as the "referent picture" on the basis of the following criteria: 1) that the referent picture should be highly similar to one or two of the distractors, 2) and yet have certain distinguishing features that a first or third-grader could pick out if given sufficient verbal clues.

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[7] My Little Green Story Book (Ginn Basic Readers).

The task consisted of having listeners attempt to select the referent picture in each set of four pictures on the basis of speakers' tape-recorded descriptions of the referents.

A total of 12 items were pilot tested with a group of first and third-grade pupils and the 6 most discriminating items were selected for the final study. Moreover, pilot testing revealed no difficulty on the part of first and third-graders in understanding the nature of the task.

Design and Subjects

The study employed a 3 x 4 design, with 10 independent observations (listener scores) per cell. The two factors were "Speaker Condition," having three levels (first-grade, third-grade, adult), and "Listener Condition," having four levels (first-grade, third-grade, teacher, teacher aide). In the first phase of the experiment (May 1970), pupil subjects were randomly selected from among 85 first and third-grade black pupils at a Jackson, Michigan "inner city" school which had instituted mixed-age family groupings at the start of the school year.[8] After randomly selecting six first-graders and six third-graders to be speakers, one pupil from each grade was assigned to record a description of one of the six referent pictures. Thirty additional black pupils from each grade were selected to be listeners and were randomly assigned to one of the three speaker conditions. In a second phase of the study (July 1970), 30 teachers and 30 teacher aides from "inner city" schools in the Saginaw, Michigan

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[8]Since there were too few white pupils in the school (8 out of a total first and third-grade population of 102) to permit inclusion of race as a factor in the design, the sample was selected from among black first and third-graders only. Nine pupils receiving speech therapy were also eliminated prior to selection of the sample.

Although the pupils at the Jackson school have been divided into mixed-age family groups, for convenience of description the subjects in this study will be labeled as first-graders or third-graders, according to the grade level to which they would be assigned in a graded school program.

district were randomly selected from among 157 female participants in a summer in-service training project. Ten subjects in each group of 30 were randomly assigned to one of the three speaker conditions.

The speaker condition tapes were prepared as follows. The first-grade speaker condition tape was composed of six descriptions, each referent picture described by one first-grade speaker. The third-grade speaker condition tape was constructed in the same manner. Each of the pupil speakers attempted two warm-up descriptions before his description of the assigned referent picture was recorded. The adult speaker condition tape consisted of a description of each referent picture by one of the experimenters.

Procedure

Experimental conditions were the same for all listeners: after one warm-up item to verify that the subject understood the task, the appropriate speaker condition tape of six descriptions was played, and for each item, the subject was asked to select the picture he thought was described on the tape from among the four pictures displayed before him. Order of presentation of the items and arrangement of the four pictures in each set was the same for all subjects. Listeners' scores on the six task items (one point for correct choice per item) constituted the dependent measure.

RESULTS

Analysis of variance revealed significant speaker condition and listener condition main effects ($p < .0001$ in both cases), and a non-significant speaker X listener interaction ($p < .2168$). Post hoc paired comparisons among levels of each independent variable were tested by means of Tukey confidence intervals (in Kirk, 1969, pp. 88-90). The results of this procedure were as follows:

Under the factor "Speaker Condition":

1. Listeners hearing descriptions by adult speakers scored significantly higher than listeners hearing descriptions by third-grade speakers ($p < .01$).

2. Listeners hearing descriptions by third-grade speakers scored significantly higher than listeners hearing descriptions by first-grade speakers ($p < .01$).

Under the factor "Listener Condition":

1. No significant differences were found between teacher and teacher aide listeners.
2. No significant differences were found between adult(teacher or teacher aide) and third-grade listeners.
3. Teacher and teacher aide listeners scored significantly higher than ~~third-~~ first-grade listeners ($p < .01$).
4. Third-grade listeners scored significantly higher than first-grade listeners ($p < .05$).

The following tables are presented in the Appendix: (1) mean scores on the dependent variable, by speaker condition and listener condition (Table 4, p. ii); (2) the two-way analysis of variance (Table 5, p. iii); (3) the Tukey confidence intervals for each post hoc comparison (Table 6, p. iv).

In addition to the analysis of scores on the experimental task, demographic data were examined to determine whether potential confounding variables, such as IQ, SES or sex, may have biased the first and third-grade listener scores in one direction or another. As Table 1 (Appendix, p. i) reveals, the first and third-grade samples were virtually identical with respect to mean IQ and highly similar with respect to socio-economic background. In designing the study it was planned to control possible confounding of sex with the experimental factors by randomly assigning equal numbers of boys and girls to each cell. This was possible in the case of the first-graders, but was not possible in the case of the third-graders due to the high enrollment of girls in that grade. Thus, the third-grade sample included 19 girls and 11 boys. The research regarding sex differences in language ability has yielded contradictory findings (See McCarthy, 1954, for a review of the literature). One recent study of communication among elementary school children and teachers (Peisach, 1965) found that girls' comprehension of teacher and peer speech was superior to that of boys at the

fifth-grade level, but not at the first-grade level. In order to determine whether sex differences may have affected the third-graders' scores in our samples (due to the disproportionately large number of girls in that group), a supplemental analysis of variance was performed (see Table 9, in Appendix, p. vi). The three-way ANOVA (including the factors Speaker Condition, Listener Condition, and Sex of Listener) revealed no significant main effect for sex. Main effects for speaker condition and listener condition were significant, but none of the interactions were significant. Thus, the results of this analysis confirm those obtained in the two-way ANOVA, and disconfirm the existence of confounding sex effects. The results regarding sex differences should be accepted with caution, however, due to the small number of observations in certain cells when the factor sex is included in the design.

In the case of the adult listener sample, sex differences were controlled by selecting only female teachers and teacher aides. Simple random sampling of the female participants in the Saginaw in-service training project yielded the following distribution by race: teachers-16 white, 14 black; teacher aides-5 white, 25 black. Although there were not enough white teacher aides to permit analysis of race as a factor in the design, the mean scores of teachers and teacher aides were calculated by race (Table 10, in Appendix, p. vii). Examination of these means reveals that within each racial group teacher aides scored only slightly higher than teachers. However, in the case of both teachers and teacher aides, blacks scored considerably higher than whites.

Analysis of the transcripts of the speaker condition tapes (see Table 7, in Appendix, p. v) revealed considerable differences between the adult speaker and the pupil speaker descriptions. The significantly higher scores obtained by listeners under the adult speaker condition, as compared to listeners under either of the pupil speaker conditions, would appear to be a function of several factors: (a) the adult speaker descriptions were on the average approximately 16 words longer than the pupil speaker descriptions; (b) the adults used a greater variety of nouns and verbs and a larger number of prepositional phrases. On the other hand, analysis of the transcripts revealed little evidence that would explain why listeners under the third-grade speaker

condition scored significantly higher than listeners under the first-grade condition. The mean lengths of the first and third-graders' descriptions were nearly the same, and there were only small differences with respect to variety and type vocabulary, level of syntax or grammatical correctness. Further analysis is needed in order to determine whether the differences between speaker conditions may be due to such factors as choice of imagery, coherence of description, or quality of enunciation.

The pupil transcripts revealed less evidence of systematic deviation from standard English grammar than might be expected, given the fact that the pupils in this sample came from a black "inner city" community. Two types of grammatical deviations occured, both involving the use of verbs, with a combined frequence of 14 deviations for 32 verbs used. It would be necessary to compare the transcripts obtained in this study to transcripts of white first and third-graders in order to determine whether the observed type and frequency of grammatical deviations may be ascribed to black language patterns or whether the observed deviations are typical for children of this age irrespective of race.

DISCUSSION

Before discussing the implications of this study for education, several limitations should be pointed out.

1. The sample used in this study restricts generalization of results to black first and third-grade pupils and to teachers and teacher aides of both races in "inner city" elementary schools.
2. The experimental procedure was restricted to verbal, task-oriented communication; therefore the results cannot be generalized to various sorts of nonverbal and/or social communication that may take place in the classroom.
3. The experimental procedure examined teacher and teacher aide comprehension of child speech, but did not directly measure pupil comprehension of teacher and teacher aide speech. The adult speaker descriptions were by the experimenters.

Consequently, it is not known whether the adult speaker descriptions are representative of the type of verbal information that would be transmitted by elementary school teachers or teacher aides. In order to assess the degree of equivalence between the adult speaker descriptions and teacher or teacher aide descriptions, tape-recorded descriptions of the referent pictures by a random sample of "inner city" teachers and teacher aides should be obtained and compared with the adult speaker recordings.

The educational implications of this study involve both adult-pupil communication, and pupil-pupil communication in the "inner city" classroom. All listeners performed significantly better when hearing adult speaker description than when hearing first or third-grade speaker descriptions. At face value this finding appears to cast some doubt on the family grouping assumption that pupils may be as effective in teaching other pupils as an adult would be. There was no significant difference between teacher and teacher aide comprehension of pupil speech; thus, we may expect teacher aides to perform as effectively in this domain as certified teachers. Examination of the mean scores for teachers and teacher aides (see Table 4, in Appendix, p. ii) reveals that this lack of statistical significance is probably due to the virtually identical scores under the third-grade and adult speaker conditions. Under the first-grade speaker condition there was a sizeable difference between teacher aide and teacher scores, suggesting that the aides may comprehend first-graders' speech better than teachers. If this difference is in fact reliable, it may be hypothesized that teacher aides from the same ethnic minority group as pupils (as was the case in this study, see Tables 2 and 3, in Appendix, p. ii) may be particularily effective in communicating with the youngest primary pupils who have had very limited exposure to communication patterns other than those of their ethnic group. The trends illustrated by Chart I (see Appendix, p. iii) lend some support to such a hypothesis. Although teacher aides appear to be superior to certified teachers in comprehension of first-graders speech, there is a convergence of the teacher aide and teacher scores under the third-grade

speaker condition. Although there was little difference between black teachers and black teacher aides, black teacher aides scored considerably higher than white teachers, means of 5.12 and 4.69, respectively (see Table 10, in Appendix, p. vii). These results would appear to suggest that use of a black teacher aide to assist a white teacher may be of value with respect to expanding the channels of classroom communication involving black pupils. In sum, it may be speculated that in the beginning primary grades teacher aides from the same minority group as the pupils may be useful in providing a communication "bridge" between the middle class teacher and the minority group child from the "inner city." The teacher aide could assist in assuring that teacher speech patterns are comprehended by the pupils, and vice versa.

Although the results did not support the hypothesis that pupil-pupil communication was as effective as adult-pupil communication relevant to completion of a task, Chart I indicates that for first-grade listeners there is a greater increase in comprehension between the first and third-grade speaker conditions than between the third-grade and adult speaker conditions, as measured by this communication task. This would imply that older, more advanced pupils in the nongraded classroom might be used profitably to assist less advanced pupils with tasks involving simple verbal communication, particularly in cases where adult assistance is not possible because the teacher or teacher aide is directing other classroom activities.

Since this experimental task measured only verbal communication among pupils, it is not known to what extent various forms of nonverbal interaction might contribute to the effectiveness of communication among pupils. Piaget (1959) has suggested that in the case of younger children (age 8 or under) "acted" conversation (i.e. the use of actions, gestures and manipulation of objects) may constitute the primary mode of communication, with the verbal mode of communication gradually predominating over the acted mode as age increases. In order to assess fully the extent to which pupils may be effective "teachers" of other pupils, it would be necessary to investigate task performance involving both verbal and nonverbal communication.

This study has sought (1) to explore certain parameters of classroom communication, and (2) to develop an experimental task designed to measure verbal communication among elementary pupils, teachers and teacher aides. In order to pursue the investigation of referential communication in the elementary classroom, two lines of future research are indicated: (1) replication of this study using a completely crossed 4 X 4 design (first-grade, third-grade, teacher and teacher aide listeners and speakers), and (2) development of an experimental task involving both verbal and nonverbal communication.

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Table I: Characteristics of Pupil Listener Sample (N = 60)

A. Mean Age (in months)

1st grade (n = 30)	81.3
3rd grade (n = 30)	115.6

B. Mean IQ (Lorge - Thorndike)

1st grade (n = 24)	89.98
3rd grade (n = 24)	89.54

Note: Data were not available for 6 subjects in each grade.

C. Sex

	Male	Female	Both Sexes
1st grade	15	15	30
3rd grade	11	19	30
Both grades	26	34	60

D. Occupation of Head of Household with whom Pupil Resides.

	White Collar	Skilled Labor	Unskilled Labor	None	Total
1st grade	1	11	13	3	28
3rd grade	1	5	17	6	29
Both grades	2	16	30	9	57

Note: Data were not available for two first-graders and one third-grader.

Table 2: Classification of Speakers by Race

		White	Black	Total
Speakers	1st grade	--	6	6
	3rd grade	--	6	6
	Adult	2	--	2

Table 3: Classification of Listeners by Race

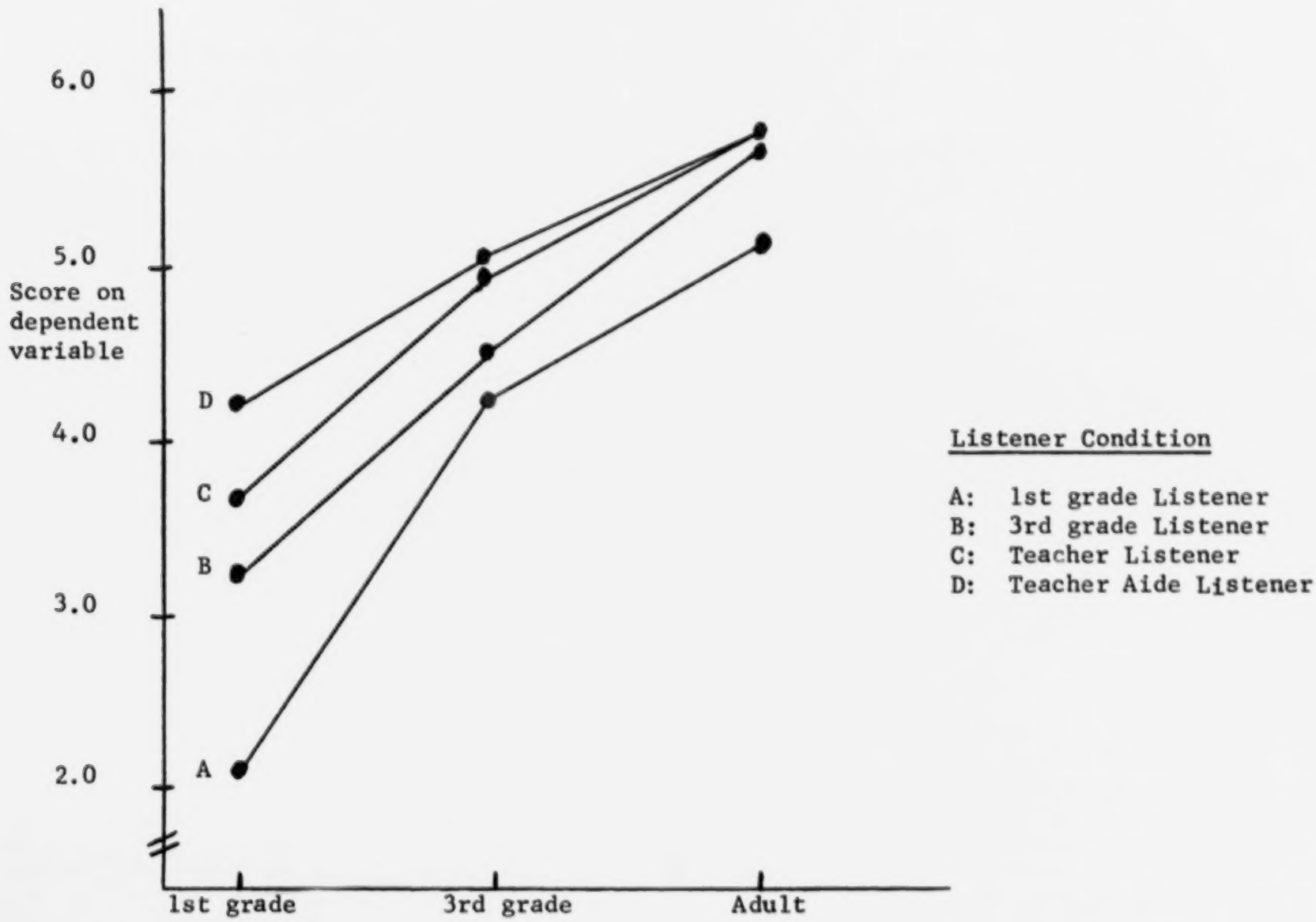
		White	Black	Total
Listeners	1st grade	--	30	30
	3rd grade	--	30	30
	Teacher Aide	5	25	30
	Teacher	16	14	30

Table 4: Mean Scores on the Dependent Variable, by Speaker Condition and Listener Condition.

		Speaker Condition			
		First grade	Third grade	Adult	All Speaker Conditions
Listener Condition	First grade	2.1	4.3	5.2	3.87
	Third grade	3.3	4.6	5.7	4.53
	Teacher	3.7	5.0	5.8	4.83
	Teacher Aide	4.3	5.1	5.8	5.07
	All listener conditions	3.35	4.75	5.63	4.58

Note: A total score of 6 was possible.
N = 120 (10 observations per cell).

Chart I: Mean Scores on Dependent Variable, by Speaker and Listener Condition. (N = 120)



Note: Chance level score = 1.5.

Table 5: Analysis of Variance; Two-way Fixed Effects Model; Speaker Condition by Listener Condition. (N = 120)

Source of Variation	df	Mean Square	F ratio	p
Speaker Condition	2	52.6750	54.9652	.0001
Listener Condition	3	8.1194	8.4725	.0001
S x L Interaction	6	1.3528	1.4116	.2168
Error	108	.9583		
Total	119			

Table 6: Tukey Confidence Intervals; Post hoc Comparisons.

I. Under the factor Speaker Condition

99% Confidence Interval: ± .6516
(parameters: no. of levels = 3, no. obs / level = 40)

Comparison	Difference between means	Results
1. Adult - 3rd grade	5.625 - 4.75 = .875	Sig., p = .01
2. 3rd grade - 1st grade	4.75 - 3.35 = 1.40	Sig., p = .01

II. Under the factor Listener Condition

95% Confidence Interval: ± .6613
(parameters: no. of levels = 4, no. obs / level = 30)

Comparison	Difference between means	Results
1. Aide - Teacher	5.0667 - 4.8333 = .2334	N.S.
2. Aide - 3rd grade	5.0667 - 4.5333 = .5334	N.S.
3. Teacher - 3rd grade	4.8333 - 4.5333 = .3000	N.S.
4. 3rd grade - 1st grade	4.5333 - 3.8667 = .6666	Sig., p = .05

99% Confidence Interval: ± .8061
(parameters: no. of levels = 4, no. obs / level = 30)

Comparison	Difference between Means	Results
5. Aide - 1st grade	5.0667 - 3.8667 = 1.2000	Sig., p = .01
6. Teacher - 1st grade	4.5333 - 3.8667 = .9666	Sig., p = .01

Table 7: Analysis of the Speaker Transcripts

	Speaker Condition		
	First grade	Third grade	Adult
A. Length of description (mean no. of words per description)	26.3	28.1	42.8
B. Variety and type of vocabulary (total no. of different words in all 6 descriptions)			
No. of nouns	35	38	45
No. of verbs	15	17	29
No. of adjectives	1	5	8
No. of pronouns	7	8	6
C. Syntactical components (totals for all 6 descriptions)			
No. of prepositional phrases	6	6	15
No. of subordinate clauses	2	0	2
D. Grammatical Errors (totals for all 6 descriptions)			
3rd per. sing. of present tense	2	1	0
Auxiliary of compound verbs	5	6	0

Note: Scoring Procedure

Part A: Contractions such as "he's" were counted as two words.

Part B: Repetitions of a noun, a verb, an adjective or a pronoun within the same description were counted only once.

Part C: Prepositional phrases and subordinate clauses were counted each time they occured as a description.

Part D: Only two types of grammatical errors were found in the transcripts:
(1) dropping of the "s" on the third person singular present tense verb form (eg. "He go").
(2) dropping of the auxiliary "to be" or "to have" in compound verbs (eg. "He climbing" or "They gone").

Table 8: Mean Scores of Pupil Listeners, by Speaker Condition, Listener Condition and Sex of Listener. (N = 60)

		Speaker Condition: 1st grade	3rd grade	Adult	Total	
Listener Condition: 1st grade	Male	2.2 (5)	4.0 (5)	4.6 (5)	3.6 (15)	3.87 (30)
	Female	2.0 (5)	4.6 (5)	5.8 (5)	4.13 (15)	
3rd grade	Male	3.4 (5)	3.67(3)	5.6 (3)	4.09 (11)	4.53 (30)
	Female	3.2 (5)	5.0 (7)	5.71(7)	4.79 (19)	
Total		2.7 (20)	4.54(20)	5.45(20)	4.2 (60)	

Note: A score of 6 was possible. The number of observations per cell is given in parentheses.

Table 9: Analysis of Variance; Three-way Fixed Effects Model; Speaker Condition, by Listener Condition, by Sex of Listener. (N = 60)

Source	df	Mean Square	F ratio	p
Speaker Condition	2	38.7500	33.9652	.0001
Listener Condition	1	6.6667	5.8435	.0195
Sex of Listener	1	2.4012	2.1047	.1534
Speaker X Listener	2	1.3583	1.1906	.3129
Speaker X Sex	2	1.7121	1.5007	.2333
Listener X Sex	1	0.0647	0.0568	.8123
Speaker X Listener X Sex	2	1.0323	0.9049	.4114
Error	48	1.1409		
Total	59			

Table 10: Mean Scores of Adult Listeners, by Listener Condition and Race. (N = 60)

Race	Listener Condition: Teacher	Teacher Aide	Total
Black	5.00 (14)	5.12 (25)	5.08 (39)
White	4.69 (16)	4.80 (5)	4.71 (21)
Total	4.83 (30)	5.07 (30)	4.95 (60)

Note: A score of 6 was possible.
The number of observations per cell is given in parentheses.